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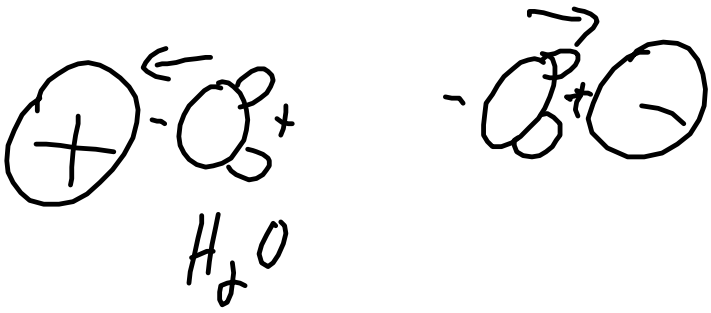
Q3 vinyl record gets charged negatively (vinyl) and the dust is neutral, so it is attracted because the charge on the dust creates a dipole moment - closer charge is more attracted than the farther charge is repulsed.

Q4 water molecules are highly polar (positive on one side, negative on the other), so they are attracted to + charged stuff



Electric Fields, E

electric field strength, E and electric field lines

recall, gravitational field strength, $g=F_g/m$

it is directed towards the large mass causing the

gravitational pull

$g = GM/r^2$ M is the big mass causing the pull (Earth) r is the distance to the centre of M

In the same way, electric field strength, E is the electrostatic force per unit charge,

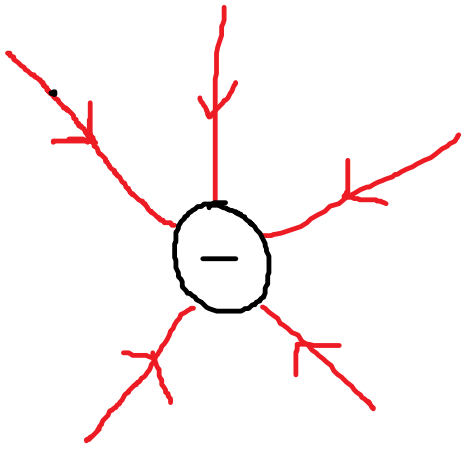
$E=F_e/q$

on a small positive test charge, q
units: N/C

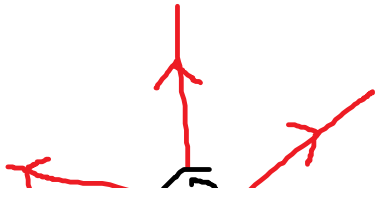
the electric field strength around a charge Q is given by

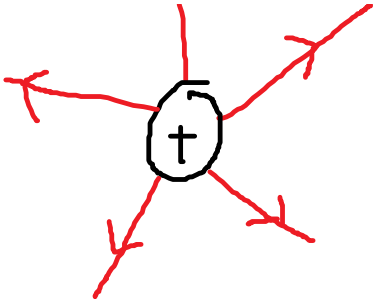
$E = kQq/r^2/q = kQ/r^2$

E is a vector- the direction shows the direction of force on a positive charge put at that point in space.

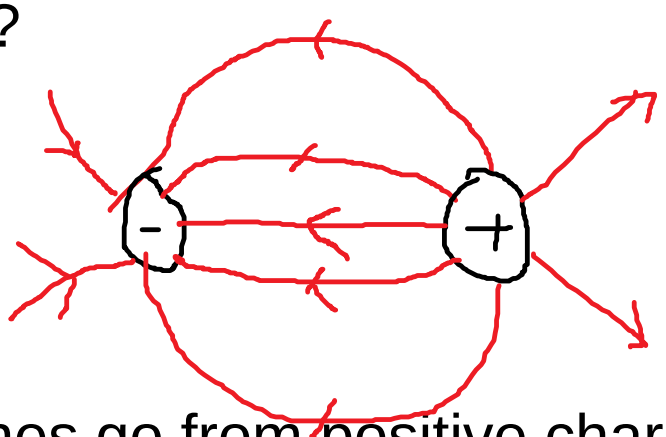


density of the lines represent the strength of the electric field - closer to the charge, the field is stronger

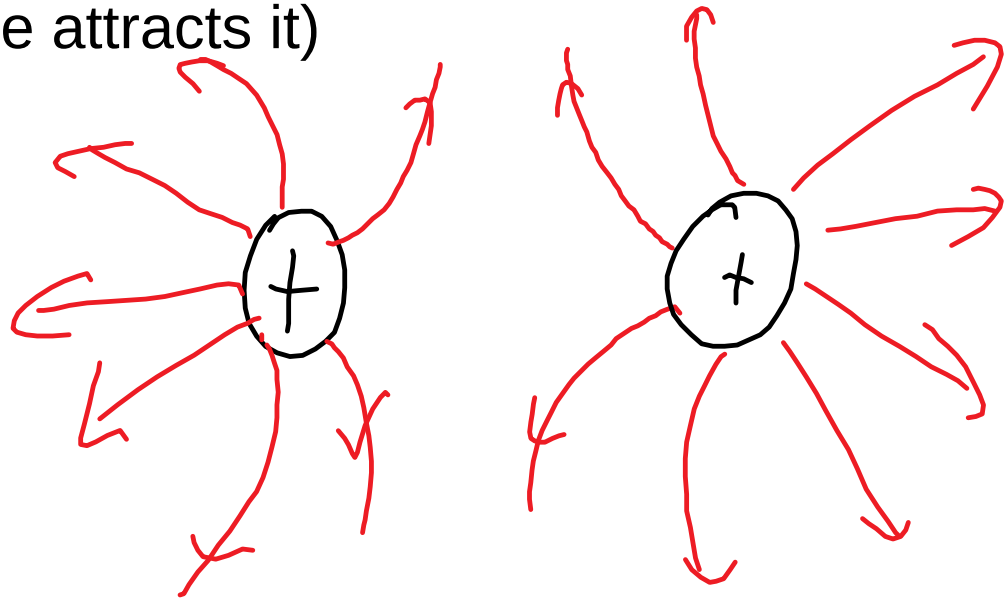


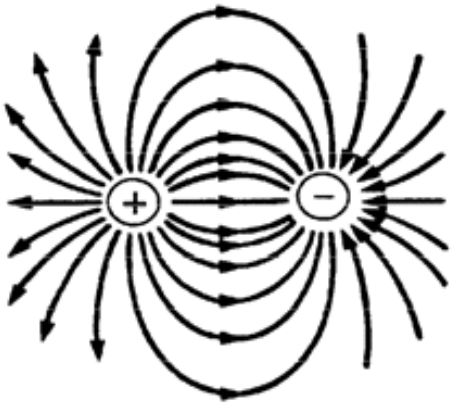


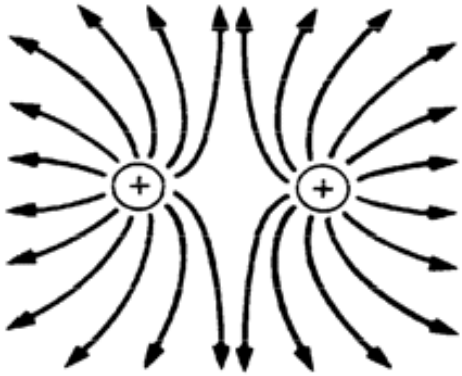
What would the electric field lines look like for a dipole?



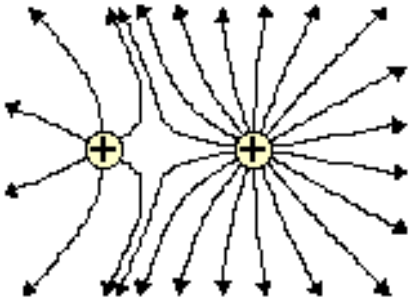
field lines go from positive charges to the negative charges (because the positive charge repels the small positive test charge, q, and the negative charge attracts it)

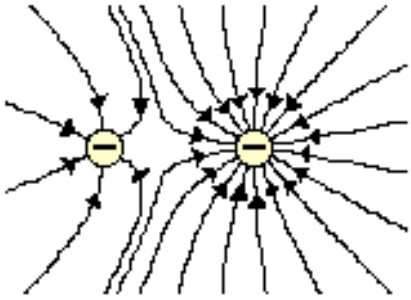


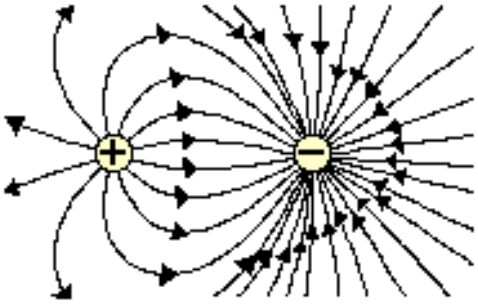


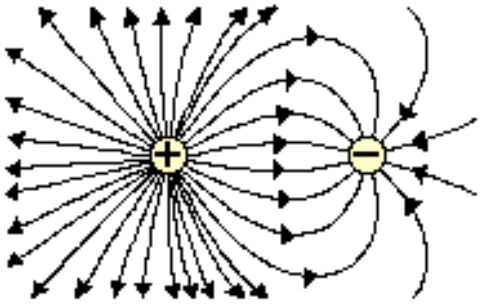


Electric Field Line Patterns for Objects with Unequal Amounts of Charge

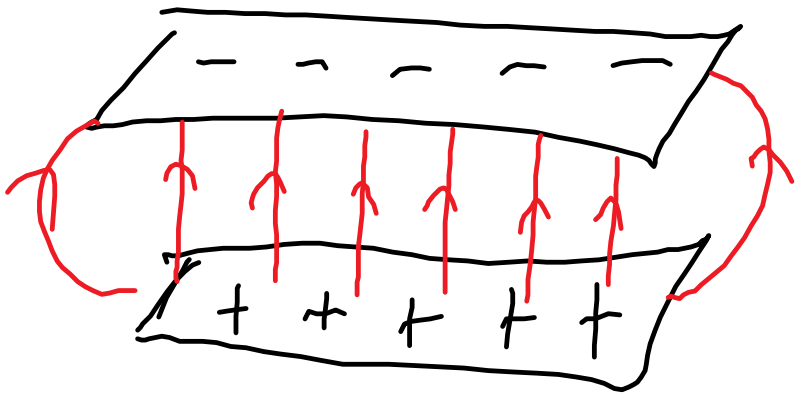








Parallel charged plates - uniform electric field between the plates that goes from the positive plate to the negative plate with edge effects around the edge



eg. A balloon is charge to 4.0 micro coulombs.

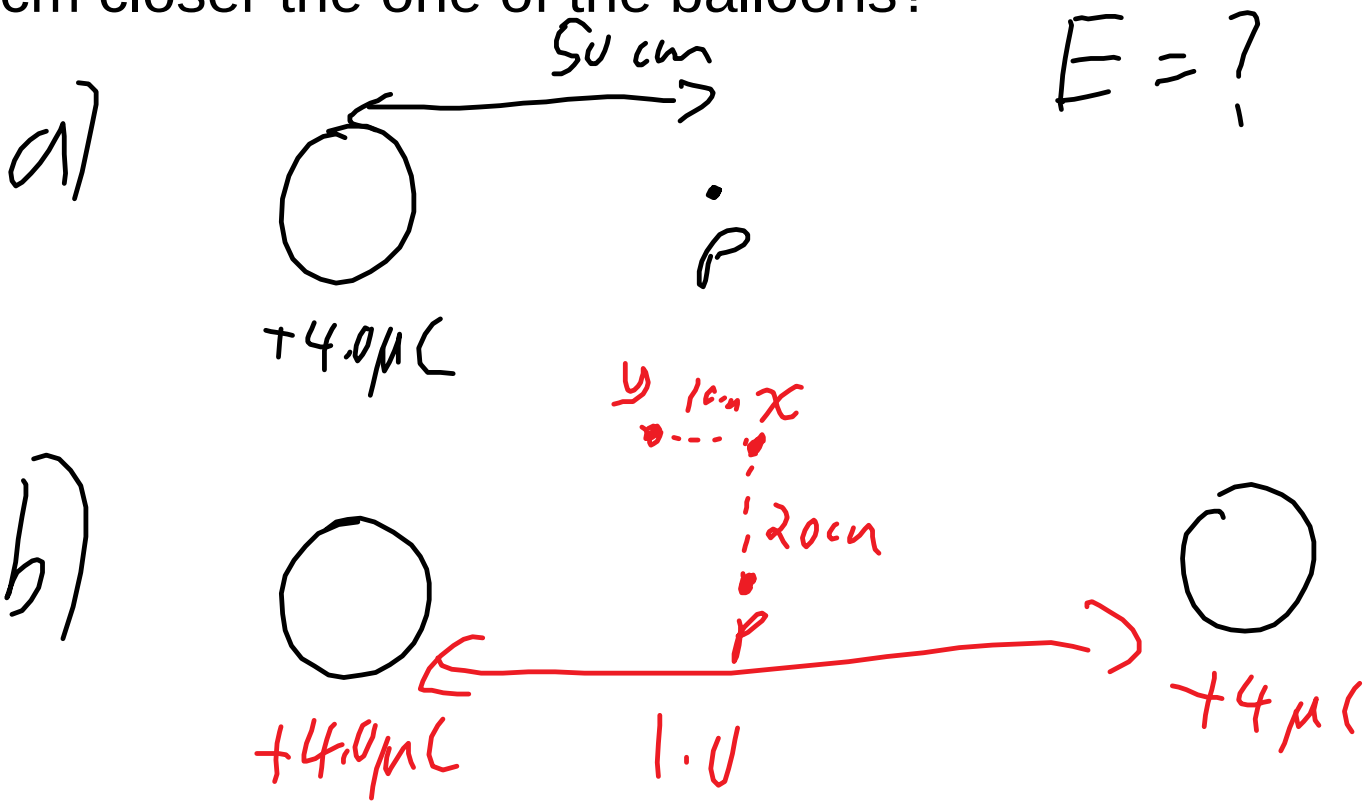
a) What is the electric field strength 50.0 cm from the centre of the balloon?

b) if a second equally charged balloon is placed 1.00 m away, what is the electric field strength

i) directly between them (centre point)

ii) 20.0 cm above the centre point (vectors!)

iii) keeners 20.0 cm above the centre point and 10.0 cm closer the one of the balloons?



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